

WHAT IS CLAIMED IS:

1. An off-road vehicle comprising:

a frame assembly, a pair of front wheels and a pair of rear wheels that are suspended relative to the frame assembly, an operator's seat mounted to the frame;

a prime mover selectively connectable to the pair of front wheels and the prime mover connected to the pair of rear wheels, the prime mover comprising an output shaft;

a front differential mechanism being operatively connected to the front wheels, the front differential mechanism comprising a front input shaft, the front differential mechanism being adapted for operation in an unlocked mode, a locked mode and a disabled mode, wherein the disabled mode results in the front wheels being disconnected from the prime mover;

a front drive line connecting the output shaft of the prime mover and the front input shaft of the front differential mechanism;

a rear differential mechanism being operatively connected to the rear wheels, the rear differential mechanism comprising a rear input shaft, the rear differential mechanism being adapted for operation in an unlocked mode and a locked mode;

a rear drive line connecting the output shaft of the prime mover and the rear input shaft of the rear differential mechanism;

and a switching system adapted to allow an operator to select among only the following combinations of modes for the front and rear differentials: front disabled and rear unlocked; front disabled and rear locked; front unlocked and rear unlocked; front unlocked and rear locked; and front locked and rear locked.

2. The vehicle of Claim 1, wherein the switching system comprises a front differential switching device and a rear differential switching device that are separate components from each other.

3. The vehicle of Claim 2 further comprising a front differential mode selector, the front differential mode selector being in electrical communication with the front differential switching device.

4. The vehicle of Claim 3 further comprising a rear differential mode selector, the rear differential mode selector being mechanically connected with the rear differential switching device.

5. The vehicle of Claim 4, wherein the rear differential mode selector is positioned proximate the operator's seat.

6. The vehicle of Claim 4, wherein the rear differential mode selector comprises a lever.

7. The vehicle of Claim 2, wherein the front differential mode selector is positioned proximate the operator's seat.

8. The vehicle of Claim 2, wherein the front differential mode selector comprises a push-button type switch that is moveable among three distinct positions.

9. The vehicle of Claim 1, wherein the front drive line has a longer total length than the rear drive line.

10. The vehicle of Claim 1, wherein the front differential mechanism is positioned further from the prime mover than the rear differential mechanism.

11. The vehicle of Claim 1, wherein the front drive line is spline coupled to the front differential mechanism.

12. The vehicle of Claim 1, wherein the front drive line is connected to the front differential mechanism with a universal joint.

13. An off-road vehicle comprising:

a frame, a pair of front wheels and a pair of rear wheels supporting the frame, a prime mover powering the wheels, the prime mover comprising an output shaft;

a front differential mechanism connected to the front wheels, the front differential mechanism comprising a front input shaft, a front drive connecting the output shaft of the prime mover and the front input shaft of the front differential mechanism, the front differential mechanism being adapted for operation in at least an unlocked mode or a locked mode;

a rear differential mechanism connected to the rear wheels, the rear differential mechanism comprising a rear input shaft, a rear drive connecting the output shaft of the prime mover and the rear input shaft of the rear differential mechanism, the rear differential mechanism being adapted for operation in at least an unlocked mode or a locked mode;

and a switching system adapted to allow an operator to independently select a desired operational mode for each of the front differential mechanism and the rear differential mechanism.

14. The off-road vehicle as set forth in Claim 13, wherein the switching system comprises a first switching device, the first switching device comprising an electrically operable actuator that actuates a locking assembly of the front differential mechanism between at least a locked position and an unlocked position, and a first mode selector that is electrically connected to the switching device such that an operator can select the desired operational mode of the front differential mechanism with the first mode selector.

15. The off-road vehicle as set forth in Claim 14, wherein the first mode selector comprises a switch member movable between at least two positions, the at least two positions corresponding to the locked and unlocked modes of the front differential mechanism.

16. The off-road vehicle as set forth in Claim 15, wherein the switch member comprises a push-button type switch member.

17. The off-road vehicle as set forth in Claim 14, wherein the first switching device is coupled with the front differential mechanism and the first mode selector is disposed in a driver's area of the vehicle.

18. The off-road vehicle as set forth in Claim 14, wherein the front differential mechanism is inhibited from entering the locked mode unless the rear differential mechanism is in the locked mode.

19. The off-road vehicle as set forth in Claim 14, wherein the switching system additionally comprises a second switching device, the second switching device being adapted to switch the rear differential mechanism between at least the locked mode and the unlocked mode, the second switching device comprising a mechanically operable actuator that actuates the rear differential mechanism, and a second mode selector that is mechanically connected to the second switching device such that the operator can select the desired operational mode of the rear differential mechanism with the second mode selector.

20. The off-road vehicle as set forth in Claim 14, wherein the front differential mechanism also is adapted to assume a disabled mode in which the front differential mechanism does not transfer power from the prime mover to the front wheels, and the switching device being adapted to allow the operator to selected a desired operational mode for the front differential mechanism from the locked mode, the unlocked mode and the disabled mode.

21. The off-road vehicle as set forth in Claim 13, wherein the switching system comprises a switching device adapted to switch the rear differential mechanism between the locked mode and the unlocked mode, the switching device comprising an actuator that mechanically actuates the rear differential mechanism between the locked mode and the unlocked mode, and an operating unit is mechanically connected to the switching device such that movement of the operating unit causes the switching device to switch the rear differential mechanism.

22. The off-road vehicle as set forth in Claim 21, wherein the operating unit comprises a lever movable between two positions corresponding to the unlocked mode and the locked modes of the rear differential mechanism.

23. The off-road vehicle as set forth in Claim 21, wherein the switching device is coupled with the rear differential mechanism and the operating unit is disposed in a driver's area of the vehicle remotely from the switching device.

24. The off-road vehicle as set forth in Claim 13, wherein one of the front and rear differential mechanisms is allowed to move into the locked mode only when the other differential mechanism already is in the locked mode.

25. The off-road vehicle as set forth in Claim 24, wherein the one of the differential mechanisms is the front differential mechanism, and the other differential mechanism is the rear differential mechanism.

26. The off-road vehicle as set forth in Claim 13, wherein the output shaft of the prime mover is directly coupled with the front drive and with the rear drive.

27. The off-road vehicle as set forth in Claim 26, wherein either the front or rear drive comprises a bevel gear unit that engages with a bevel gear on the output shaft.

28. The off-road vehicle as set forth in Claim 13, wherein the prime mover comprises an internal combustion engine.

29. An off-road vehicle comprising:

a frame, a pair of front wheels and a pair of rear wheels supporting the frame, a prime mover powering the wheels, the prime mover comprising an output shaft;

a front differential mechanism connected to the front wheels, the front differential mechanism comprising a front input shaft, a front drive connecting the output shaft of the prime mover and the front input shaft of the front differential mechanism;

first means for switching the front differential mechanism between at least an unlocked mode and a locked mode;

a rear differential mechanism connected to the rear wheels, the rear differential mechanism comprising a rear input shaft, a rear drive connecting the output shaft of the prime mover and the rear input shaft of the rear differential mechanism,

and second means for switching the rear differential mechanism between an unlocked mode and a locked mode, the first means and the second means being separate components.

30. The off-road vehicle as set forth in Claim 29, wherein the one of the front and rear differential mechanism is inhibited from entering the locked mode unless other of the front and rear differential mechanisms is in the locked mode.

31. An off-road vehicle comprising:

a frame, a pair of front wheels and a pair of rear wheels supporting the frame, a prime mover powering the wheels, the prime mover comprising an output shaft;

a front differential mechanism connected to the front wheels, the front differential mechanism comprising a front input shaft, a front drive connecting the output shaft of the prime mover and the front input shaft of the front differential mechanism, the front differential mechanism being adapted for operation in an unlocked mode, a locked mode or a disabled mode;

a rear differential mechanism connected to the rear wheels, the rear differential mechanism comprising a rear input shaft, a rear drive connecting the output shaft of the prime mover and the rear input shaft of the rear differential mechanism, the rear differential mechanism being adapted for operation in at least an unlocked mode or a locked mode.

32. The off-road vehicle as set forth in Claim 31 additionally comprising:

a first switching device configured to switch the front differential mechanism among the unlocked mode, the locked mode and the disabled mode, the first switching device comprising an electrically operable actuator, and

a mode selector electrically connected to the first switching device, the first switching device being adapted to switch the front differential mechanism in response to a position of the mode selector.

33. The off-road vehicle as set forth in Claim 0 additionally comprising:

a second switching device configured to switch the rear differential mechanism among the unlocked mode and the locked mode, the second switching device comprising a mechanically operable actuator; and

an operating unit mechanically connected to the second switching device, the second switching device switching the rear differential mechanism in response to a position of the operating unit.

34. An off-road vehicle comprising:

a frame, a pair of front wheels and a pair of rear wheels supporting the frame, a prime mover powering the wheels, the prime mover comprising an output shaft;

a front differential mechanism connected to the front wheels, the front differential mechanism comprising a front input shaft, a front drive connecting the output shaft of the prime mover and the front input shaft of the front differential mechanism, the front differential mechanism being adapted for operation in at least an unlocked mode or a locked mode;

a rear differential mechanism connected to the rear wheels, the rear differential mechanism comprising a rear input shaft, a rear drive connecting the output shaft of the prime mover and the rear input shaft of the rear differential mechanism, the rear differential mechanism being adapted for operation in at least an unlocked mode or a locked mode;

one of the front differential mechanism and the rear differential mechanism being allowed to enter the locked mode only when the other one of the front differential mechanism and the rear differential mechanisms is in the locked mode.